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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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San Francisco, CA 94105-3901

APR 8 1980

Terry Reed, Field Manager
Winnemucca Field Office
Bureau of Land Management
5100 E. Winnemucca Blvd.
Winnemucca, NV 89445

Dear Mr. Reed:

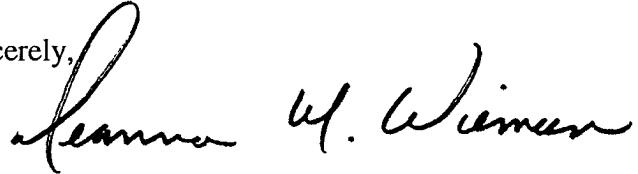
The U.S. Environmental Protection Agency (EPA) has reviewed the **Draft Environmental Impact Statement (DEIS) for the Marigold Mine Expansion Project, Humboldt County, Nevada**. Our review is conducted pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementation Regulations at 40 CFR 1500-1508, and Section 309 of the Clean Air Act.

The DEIS evaluates alternatives for expanding the existing Marigold Mine. Glamis Marigold Mining Company (GMMC) has proposed to expand two existing pits and develop two new pits; expand existing and develop two new waste rock dumps; expand existing and add new heap leach facilities; expand existing and add new tailings facilities; and construct ancillary facilities such as haul roads, ponds, soil stockpiles, and diversion channels. Alternatives include the 8-South Partial Pit Backfill Alternative and the No Action Alternative.

We have rated this DEIS as EO-2 -- Environmental Objections-Insufficient Information (See enclosed "Summary of Rating Definitions and Follow Up Actions"). Our objections are based on the project's potentially significant impacts to water quality and air quality. We believe these impacts should be avoided to the extent possible in order to provide adequate protection for the environment and that additional mitigation measures are necessary for impacts which are unavoidable. The DEIS also fails to demonstrate compliance with EPA's Guidelines pursuant to Clean Water Act Section 404(b)(1), i.e., the alternatives analysis is too narrow for the stated project purpose and there is insufficient information to determine the practicability of the alternatives evaluated. The Final Environmental Impact Statement (FEIS) should provide additional information regarding impacts to water and air quality, ecological risks, bonding and closure, mitigation measures, and geochemical characterization. Our detailed comments, which focus specifically on these issues, are enclosed.

We appreciate the opportunity to review this DEIS. Please send a copy of the FEIS to this address when it is officially filed with our Washington, D.C., office. If you have any questions, please call me at (415) 744-1566, or have your staff call Jeanne Geselbracht at (415) 744-1576.

Sincerely,

A handwritten signature in black ink, reading "Deanna M. Wieman". The signature is fluid and cursive, with the first name "Deanna" being more prominent and the last name "Wieman" following in a similar style.

Deanna M. Wieman, Deputy Director
Cross-Media Division

003186

Enclosures

cc: Dave Gaskins, NDEP
Nancy Kang, Army Corps of Engineers - Reno
Jolaine Johnson, NDEP

General Comments

The DEIS states that the proposed 8-North Pit would only be mined if gold prices are above \$400 per ounce. All other pits have reserves that can be economically recovered at less than \$400 per ounce. Given that current gold prices are far below \$400 per ounce, the FEIS should identify the cost at which GMMC believes the other pits can be economically recovered.

An alternative that would place waste rock from the 8-North Pit into the proposed 5-North Pit was eliminated from detailed analysis in part because if backfilling the 5-North Pit were required, and the 8-North Pit were never developed, the operator would be in noncompliance for not backfilling the 5-North Pit with material from a non-viable ore body (DEIS, p. 2-46). This reasoning appears flawed, as BLM could easily include a condition in the Plan of Operation (POO) that exempts the operator from backfilling 5-North Pit with 8-North waste rock if the 8-North Pit is never developed. The FEIS should more thoroughly evaluate the logistics, economics, and environmental impacts of partially or completely backfilling the 5-North Pit with 8-North Pit waste rock. The costs and benefits of temporary storage of waste rock on the surface and later backfilling of the 5-North Pit should be discussed.

Clean Water Act Section 404

The DEIS (p. 3-30,31) states that 1.3 acres of waters of the U.S. would be disturbed by the Proposed Action and that the project would be authorized under Nationwide Permit 26. Nationwide Permit 26, however, is no longer valid (as of March 7, 2000) and cannot be applied to this project. The new Nationwide Permit 44 for Mining Activities, which was published by the U.S. Army Corps of Engineers (Corps) in the March 9, 2000, Federal Register (65 FR 12818) and will become effective on June 5, 2000, may be appropriate, but limits impacts to waters of the U.S. to 0.5 acre. Therefore, we expect that the proposed work would require an individual Department of the Army permit under Clean Water Act Section 404.

Section 404 regulates the discharge of dredged or fill material into waters of the United States, including wetlands and other "special aquatic sites." If a permit is required, EPA will review the project for compliance with Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the Clean Water Act ("404(b)(1) Guidelines"). The DEIS does not demonstrate compliance with EPA's 404(b)(1) Guidelines. The following comments provide the rationale for our conclusion, **within the context of CWA Section 404:**

Project Purpose - The proposed project's purpose is to mine gold. For the purposes of determining compliance with 40 CFR 230.10(a), EPA Region 9 considers that the term "overall project purpose" means the basic project purpose plus consideration of costs and technical and logistical feasibility. Therefore, the term "overall project purpose" should not include (1) project amenities, (2) a particular return on investment (unless a certain minimum return can be shown to

render a project impracticable), (3) highest and best use of the land, or (4) certain desired size requirements. EPA Region 9 treats the basic project purpose as the generic function of the activity. Pursuant to 40 CFR 230, any permitted discharge into waters of the U.S. must be the least environmentally damaging practicable alternative available to achieve the project purpose.

Geographic Scope of the Alternatives Analysis - The geographic scope proposed by the applicant is too narrow for the purposes of the alternatives analysis. In defining the project purpose as mining gold, the analysis should include all areas that would be reasonable to consider in this particular industry. The DEIS only closely analyzes two on-site alternatives besides the No Action Alternative. It appears, however, that other on-site and off-site alternatives may be available that are less environmentally damaging than the Proposed Action. In evaluating on-site alternatives, for example, the FEIS should consider whether waste rock from the 5-North Pit or the other expanding pits could economically be dumped into the 8-South Pit as partial backfill. The environmental consequences of partial backfill of waste rock from these different pits into the 8-South Pit should also be assessed. In evaluating off-site alternatives, the FEIS should include a review of other mining districts and mining properties that GMMC has considered, or should consider, in meeting its Purpose and Need.

Avoidance, Minimization, and Mitigation - EPA's 404(b)(1) Guidelines are written hierarchically to ensure that efforts are first made to achieve the objective of the CWA to eliminate discharges of pollutants into the nation's waters. Discharges that can be avoided through implementation of a practicable alternative must be avoided. Discharges that cannot be avoided must be minimized to the extent practicable. Compensatory mitigation should only be used to offset unavoidable impacts that remain.

Determination of Practicability - There is insufficient information in the draft alternatives analysis to determine practicability of the alternatives. The 404(b)(1) Guidelines define practicable as available and capable of being done taking into account cost, existing technology, and logistics [40 CFR 230.10(a)(2)]. For example, in determining practicability, a project alternative that achieves a smaller return on investment than the applicant's preferred alternative may be considered practicable for the purposes of 404 permitting, even though that alternative may not be financially acceptable to a particular applicant. In addition, it is important to note that "sunk costs" associated with one site cannot be assigned to an alternative. In evaluating alternatives under the Guidelines, these "sunk costs" cannot be added to the costs of developing a less damaging design or site.

Mitigation- If unavoidable fill in waters of the U.S. can be demonstrated, the FEIS should discuss how potential impacts would be minimized and mitigated. This discussion should include: (a) type of mitigation (e.g., conservation easements, habitat creation, etc.); (b) relation of mitigation areas to project site; (c) acreage and habitat type of waters of the U.S. that would be created or restored; (d) water sources to maintain the mitigation area; (e) revegetation plans including the numbers and age of each species to be planted; (f) maintenance and monitoring plans, including performance standards to determine mitigation success; (g) the size and location of mitigation zones; (h) the parties that would be ultimately responsible for the plan's success;

and (i) contingency plans that would be enacted if the original plan fails. Mitigation should be implemented in advance of the impacts to avoid habitat losses due to the lag time between the occurrence of the impact and successful mitigation.

In conclusion, a much more detailed analysis is required in order to determine compliance under EPA's 404(b)(1) Guidelines. This includes, but is not limited to, an increase in the geographic scope of the alternatives; a more thorough assessment of the direct and indirect impacts to the environment for each of the alternatives; comparisons of the costs and profits associated with ongoing gold operations; comparisons of costs and profits associated with the alternatives proposed in the DEIS; and mitigation measures that would be used to offset unavoidable impacts.

Water Quality

The 8-South Partial Backfill Alternative is BLM's preferred alternative if gold prices rise above \$400 per ounce. It appears to be less environmentally damaging from the standpoint of disturbing fewer acres and obviating the need for the lower reach of the Trout Creek diversion. According to the DEIS (p. 3-31), however, rain water infiltrating through the waste rock backfilled into the pit could potentially create seepage to groundwater with elevated levels of arsenic, mercury, and molybdenum. The FEIS should assess the potential for partial backfilling to cause degradation of groundwater quality below the pit and identify waste rock management measures that would be used to prevent such problems.

A shallow pit lake could form in the 8-South Pit 30 years after closure; and mercury and arsenic concentrations could be high, based on the MWMP. The DEIS, however, does not include an ecological risk assessment for this pit lake which, because of its shallow depth and possible seasonality, may be conducive to the development of wetland habitat. The FEIS should include an ecological risk assessment for this pit lake. Should the risk assessment indicate potential risks to wildlife, the FEIS should discuss means, other than backfilling from the 8-North Pit, of preventing these risks and identify the bond amount that would be required for this element of the POO. It is our understanding that BLM can update the bond amounts for any part of the mine at any time. We recommend that the new information made available through this environmental analysis be used to determine potential mitigation measures and associated bond amounts for ensuring against impacts to wildlife or groundwater. The FEIS should discuss whether waste rock from other pits could be placed into the 8-South Pit if the ecological risk of leaving it open would be unacceptable.

According to the DEIS (p. 2-17), "[m]inor leakage of pregnant solution has been reported from an existing pregnant solution pond that would be used during the operation phase of the Proposed Action; this leakage has been contained to prevent off-site contamination." The FEIS should indicate how much leakage is occurring, how it is being contained, how much on-site contamination has occurred, and whether the pond liner has been repaired. If the liner has not yet been repaired, the FEIS should indicate when it will be repaired prior to beginning the proposed action.

Based on the MWMP, waste rock seepage would be elevated in mercury, arsenic, and molybdenum; and East Hill Pit waste rock seepage could be elevated in TDS, chloride, and sulfate as well (DEIS, p. 3-28). The DEIS states that waste rock would be 1,000 feet away from the Cottonwood Creek diversion and 150 feet away from the Trout Creek diversion. Contrary to the assertions in the DEIS that the creeks would not be affected by waste rock seepage, we believe the waste rock is sufficiently close to these diversions for them to be potentially affected, especially during storm events. The FEIS should discuss mitigation measures that would be used to prevent elevated levels of contaminants from reaching these stream diversions, particularly Trout Creek.

The DEIS (p. 3-90) states that GMMC has committed not to mine the proposed 8-North Pit to a level that would intercept groundwater. The proposed action would facilitate future deeper excavation. The FEIS should discuss whether there is mineral potential below this level and whether future POO amendments could revise this commitment. If so, the FEIS should evaluate the potential environmental impacts of future mining below the water table in the 8-North Pit.

Bonding and Reclamation

We were unable to find any information in the DEIS on the bond amounts for the current and proposed operations at Marigold Mine. The re-opening of the POO should include a reassessment of the adequacy of the financial assurances. The FEIS should identify the bond amounts for each closure and reclamation activity at all of the Marigold Mine facilities by the end of the project. EPA is aware of several mines that are closing in Nevada which will need long-term operations and maintenance for treatment and/or disposal of water from heap leach pads, tailings, or other mine facilities. The FEIS should also discuss whether long-term operations and maintenance may be necessary *after* closure of the Marigold Mine facilities, and indicate the bond amounts for these as well. We do not believe it is reasonable to delay setting bond amounts for long-term operations until two years before closure. EPA strongly recommends that BLM require establishment of funds to cover all potential long-term operations and maintenance activities at the time the POO is issued, while the company still has a strong interest in the property.

Furthermore, the financial assurance necessary to fund post-closure activities will need to be kept current as conditions change at the mine. BLM should ensure that the form of the financial assurance does not depend on the continued financial health of the mining company or its parent corporation. We recommend that a financial trust be created to support long-term operations and maintenance.

In addition to determining the actual cost of reclamation, the bond calculation should consider the extra expense of taking over reclamation at a critical time during operations. Typically, bonds are calculated assuming an orderly closure at the end of mine life. It can be much more expensive to take over reclamation and other environmental protection activities in the middle of active operations, such as when the water balance is high and surplus water must be treated, or

when environmental or reclamation measures have not been successful in controlling pollution and must be redone.

The DEIS (p. 2-35) states that closure of the heap leach facilities would require treatment of the spent heaps to neutralize the weak acid dissociable (WAD) cyanide and lower the pH. The DEIS, however, does not address other contaminants in the heap that could be released after closure and seep into groundwater. For example, the leached ore subjected to Nevada's meteoric water mobility procedure was found to have elevated levels of arsenic and mercury. EPA plans to propose a new drinking water standard for arsenic this spring which would be significantly lower than the current standard. The FEIS should identify the standards for all parameters that the rinsate would have to meet under the three methods before the heap could be closed or before leachate or drain down solutions could be land applied in a constructed leach field. EPA strongly recommends against any degradation of groundwater quality. The FEIS should summarize Nevada BLM's closure policy, which we understand is due to be published soon, in the context of what would be required for this mine at closure.

The FEIS should also project how long it could take for metals, salts, pH, and total dissolved solids to be reduced to meet drinking water standards under each of the three closure scenarios discussed in the DEIS (pp. 3-35, 36). A reasonable time estimate (or range) is necessary to determine an adequate bond amount for this element of mine closure.

The DEIS (pp. 2-36, 37) states that if tailings do not meet regulatory requirements (based on MWMP and TCLP tests), an alternative closure plan would be developed with NDEP. The FEIS should describe the regulatory requirements that would apply to tailings and tailings effluent and discuss possible closure scenarios NDEP would allow should the tailings fail to meet these requirements.

The FEIS should indicate how many years effluent would drain from the tailings at the end of operations and how effluent would be evaporated after vegetation is established on the reclaimed surface.

Air Quality

Criteria Pollutants

Table 3-12 in the DEIS provides potential to emit for criteria pollutants in tons per year. There is no indication, however, how much of these potential emissions would be prevented through mitigation measures for each source. In addition, the DEIS (p. 3-61) indicates PM10 emissions monitored in 1991 and 1992, but does not estimate emissions under the proposed project. The FEIS should provide these estimates.

Hazardous Air Pollutants

The DEIS (p. 3-60) indicates that the mine would emit approximately 2.09 tons per year (4,180 pounds/year) of mercury, and 9.6 tons per year of all hazardous air pollutants (HAPs) combined. The FEIS should identify the other HAPs, identify all sources of HAPs at the mine, and discuss how all HAPs would be controlled to reduce their emissions as much as possible.

Mercury is a persistent bioaccumulative toxic substance that has been receiving increased attention over the past three years. EPA is becoming increasingly concerned about even small releases of mercury to the atmosphere. Pristine lakes in Wisconsin and remote areas of the Florida Everglades are finding mercury levels in fish above Federal standards for fish consumption. Studies have revealed this mercury is from atmospheric deposition from mercury emissions that are thousands of miles away. EPA now considers mercury air emissions over ten pounds as a significant enough concern that, starting this year, such emissions must be reported by a mining company in its annual Toxic Release Inventory submitted to EPA.

Recent 1998 Toxic Release Inventory information submitted by Nevada gold heap leach mining companies has revealed that these mines can be significant sources of mercury point source air emissions from autoclaves, roasters, stripping units, electrowinning units, retorts, refining furnaces, and carbon regeneration kilns. One facility had a total of over 9,400 pounds of mercury air emissions while another had over 2,200 pounds.

EPA has not yet developed mercury emission standards for mines, so there are no air permit limitations at present. However, it is important for a NEPA document for a heap leach gold mining operation to disclose potentially harmful air emissions whether they are regulated or not. Since EPA and others have only recently become aware of how mercury is transported through the atmosphere and how much mercury is emitted from gold heap leach mines in Nevada, it is understandable that previous gold heap leach facility EISs have not highlighted mercury emissions. We commend BLM for quantifying in the Marigold DEIS estimated mercury releases.

However, given the current levels of concern about mercury emissions to the atmosphere, it is important that the FEIS and future gold heap leach facility EISs contain a much more complete description of the existing and future sources of mercury emissions to the atmosphere. The following changes should be made to the FEIS:

- a. Table 1.1 "Marigold Mine Existing and Approved Facilities" should include ore processing as a "mine component" and list major processing equipment, including any autoclave or roaster, if they are present.
- b. Table 1.1 "Marigold Mine Existing and Approved Facilities" should include pregnant solution processing as a "mine component" and list major processing equipment, including stripping units, electrowinning units, retorts, refining furnaces, and carbon regeneration kilns, if they are present.

- c. Figure 2.4 should show the unit processes after the carbon columns, starting with the stripping circuit. Section 2.2.7 should be expanded to briefly describe these unit processes.
- d. Section 2.218.6, "Air Quality" should be expanded to include a table showing the annual mercury emissions from each processing unit that has mercury. This section should also describe any equipment to condense mercury or treat and capture mercury before it is emitted. It should also note how any condensed or captured mercury is recycled, sold, or disposed.
- e. Section 3.3 "Air Quality" should discuss in general terms national studies showing that atmospheric deposition of mercury is of environmental concern and describe the likely fate and transport of mercury air emissions from the Marigold Mine. This discussion need not be in great detail or based on site specific modeling studies, but merely acknowledge what is known nationally about the problems of atmospheric deposition of mercury and how it is affecting this country's water bodies. A sub-section should be added to specifically quantify existing and future mercury emissions to air.

The FEIS should include the above information so that decision makers are able to know existing and future impacts of mercury emissions from this facility. The absence of air emission permit standards for mercury does not preclude the need to inform decision makers and the public about the quantity and fate of mercury emitted from this facility. Having such information in hand may assist the BLM in determining whether mitigation measures for air mercury emissions should be required of this facility.

For instance, if other mining companies in Nevada have pollution control equipment on unit processes that do not have such controls at the Marigold Mine, BLM could ask that such equipment be installed at the Marigold Mine in order to reduce or mitigate potential adverse environmental impacts from mercury emissions. Pollution prevention opportunities should also be explored pursuant to the Pollution Prevention Act of 1990. Pollution prevention opportunities may include processes such as adding chemicals to the barren leach solution that will selectively keep mercury in the heap leach pile while allowing gold to leach out.

Biological Resources

According to the DEIS (p. 3-99), the Red Rock Adit would be closed to bats. We recommend that GMMC mitigate the loss of this habitat loss nearby.

Geochemistry

The acid-base accounting (ABA) test results should be included in the FEIS to verify the site's geochemical characterization. The DEIS (p. 2-25) states that if ABA tests exceed NDEP and BLM criteria, kinetic tests will be conducted. The FEIS should identify those criteria and, based on the ABA results, indicate whether kinetic tests will be necessary.

According to the DEIS (p. 3-4), the 8-North Pit has the potential for acid generation if the sulfide content of the waste rock should rise due to mining of higher sulfide ore. The geochemistry of the waste rock, spent ore, and pit walls is relevant to potential long-term impacts of the proposed project. The FEIS should present more detailed information on the fate of the sulfides and neutralizing material in waste rock, spent ore, and pit after closure, and how they would be handled during operations and closure. The FEIS should include the Sulfide Waste Management Plan as an appendix or summarize the plan in the body of the document.